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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,249	04/01/2004	Michinobu Mizumura	500.41254CX1	6984

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EXAMINER	
AHMED, SHAMIM	
ART UNIT	**PAPER NUMBER**
1765	

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/814,249	MIZUMURA ET AL.	
	Examiner	Art Unit	
	Shamim Ahmed	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/080,540.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: In the brief description of the drawings, at page 9, line 16, the phrase, "Figure 4" should have been "Figures 4a-4f".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

4. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukazawa (JP-2000-252359) in view of Nakagawa (JP-03-330278).

As to claim 1, Fukazawa discloses an etching method for organic insulation layer, wherein a plasma is formed by introducing a gaseous mixture of hydrogen and nitrogen or ammonia gas and measuring the light emission spectrum intensity ratio of Cyan (CN) and hydrogen atom (H) with respect to specific flow rates at a prescribed value. (see the abstract, paragraph 0040 and figures 5b and 6).

Fukazawa fail to teach carrying out the etching process while keeping the measured value at a value not exceeding a prescribed value.

However, in a method of plasma etching, Nakagawa teaches process is controlled in such that the light emission intensity ratio remains at a constant value (see the abstract).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Nakagawa's teaching into Fukazawa's etching process for providing the light emission intensity ratio at a constant value in order to achieve a good reproducibility of selectivity of etching velocity for a long period as taught by Nakagawa.

As to claim 2, Fukazawa teaches that the etching process is carrying out at different flow rates of H_2/N_2 in a range of 100/0-50/50-0/100, which includes a mixing ratio of hydrogen to nitrogen gas is 10 or more (see paragraph 0041).

Fukazawa does not explicitly teach that the light emission spectral intensity ratio CN/H is at 1 or less.

However, Fukazawa teaches that the light emission spectral intensity ratio of CN and H is measured for each of the flow rate of H_2/N_2 in a range of 100/0-50/50-0/100, which includes a mixing ratio of hydrogen to nitrogen gas is 10 or more that would provide the desired value of the light intensity ratio of CN/H, wherein H represents a light emission spectral intensity of hydrogen atom at a wavelength of about 486 nm and CN represents a light emission spectral intensity of Cyan molecule at a wavelength of about 388 nm (see the paragraphs 0040- 0041 and figures 5 and 6).

Therefore, one skilled in the art would have been found obvious that the intensity ratio of CN/H is achievable in a range of 1 or less within an overlapping range taught by Fukazawa as the intensity ratio is measured based on the specific flow rates of the mixing gas of hydrogen and nitrogen (figure 6) for quickly etching the organic insulation film as taught by Fukazawa.

Furthermore, it has been held that claimed ranges overlap or lie inside ranges disclosed by the prior art is a prima facie case of obviousness. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

As to claim 3, Fukazawa fails to teach that controlling the flow rate of hydrogen gas to maintain the light emission spectral intensity ratio at a desired value.

However, in a method of plasma etching, Nakagawa teaches that flow rate of an etching gas is controlled for providing the light emission intensity ratio at a constant value (see the abstract).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Nakagawa's teaching into Fukazawa's etching process for

providing the light emission intensity ratio at a constant value in order to achieve a good reproducibility of selectivity of etching velocity for a long period as taught by Nakagawa.

As to claim 4, Fukazawa teaches that the pressure is controlled at a constant value of 0.8 pa (see paragraph 0034).

As to claim 5, Fukazawa teaches all the limitation disclosed above and also teaches that the pressure is controlled at a value of 0.8 pa, which is lower than 10 pa (see paragraph 0034).

As to claim 6, Fukazawa teaches that the mixing ratio of nitrogen to hydrogen can be maintained in a range of 100/0-50/50-0/100, which includes the limitation of a mixing ratio of 10 or more (see paragraph 0041).

As to claim 7, Fukazawa teaches that the flow rate of nitrogen and hydrogen is 100 sccm (see paragraph 0041).

However, it would have been obvious to one ordinary skilled in the art at the time of claimed invention to optimize the flow rate, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch* F.2d 272, 205 USPQ (CCPA 1980).

5. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukazawa (JP-2000-252359) in view of Nakagawa (JP-03-330278) and further in view of Ye et al (6,080,529).

Modified Fukazawa discusses in the above paragraph 4 but fails to teach that the gas mixture is hydrogen and ammonia with a mixing ratio of hydrogen to ammonia gas is 10 or more.

However, in a method of etching organic film, Ye et al teach that a gas mixture of hydrogen and ammonia or nitrogen could be used (col.7, lines 24-29).

Therefore, it would have been obvious to one ordinary skilled in the art at the time of claimed invention to combine Ye et al's teaching into modified Fukazawa's process because nitrogen and ammonia are functionally equivalent as the source of nitrogen atom for efficient removal of organic film as taught by Ye et al.

Modified Fukazawa remain silent about the mixing ratio of hydrogen to ammonia is 10 or more.

However, it would have been obvious to one ordinary skilled in the art at the time of claimed invention to optimize the mixing ratio at 10 or more for reducing the etching time by increasing the etching rate because hydrogen is the principle etching component and ammonia could be the source of nitrogen used as an inert gas as known in the art.

As to claim 9, it would have been obvious to one ordinary skilled in the art at the time of claimed invention to optimize the flow rate, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch* F.2d 272, 205 USPQ (CCPA 1980).

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,7-14 of U.S. Patent No. 6,793,833. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patent 6,793,833 differs from the instant invention is that etching the prescribed depth of the insulating film while suppressing microtrenching by controlling the plasma to keep the measured value.

However, instant invention teaches the limitation of "carrying out an etching process while keeping the measured value at a value not exceeding a prescribed value".

Therefore, suppressing microtrenching would have been an obvious effect of the controlled etching process discussed in the instant invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shamim Ahmed
Examiner
Art Unit 1765

SA
February 12, 2005